FACT SHEET

L-1421

T-BUDDING--A METHOD OF PROPAGATION

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T-budding is the most common method of propagation used in the production of named or clonal varieties of tree fruits, roses and many ornamental trees and shrubs.

While the process appears complicated, almost anyone can learn the art of budding with a little practice. The essentials for success include: (1) a stock plant in an active state of growth so the cambium is soft, allowing the bark to separate or "slip" readily from the wood; (2) mature budwood, preferably in a dormant condition; (3) a sharp budding knife that will maintain a razor sharp edge; and (4) a good wrapping material that will hold the bud in place, prevent desiccation, and also keep excessive moisture from soaking the tissue.

The chief advantages of using the T-bud method are the speed with which it can be done, and the conservation of scion wood. Using the T-bud method, each lateral bud on a scion stick is a potential plant.

The T-bud is used primarily in propagating roses. A modified version called the Inverted T-bud is used in propagating most tree fruits, including the pome fruits, the stone fruits and citrus. The only difference in the two methods is the direction of the cut in making the scion shield, and the direction in which the scion is inserted into the opening on the understock. The producer should use the method he thinks most convenient.

Selection of Budwood

Budwood is cut from mature shoots of the current season's growth. In selecting budwood for fruit trees, vigorous shoots which have developed a terminal bud will usually have mature lateral buds in each leaf axil. The maturity of rose budwood is usually determined by the color of the thorns. After the thorns are hard and turning brown the lateral buds are usually mature.

The leaf blades are clipped from fruit budsticks, leaving a short length of petiole below the bud. The complete leaf is usually removed when preparing rose budwood. The thorns are also removed from rose budwood in order to speed up the budding operation.

The budsticks or scions are wrapped in wet newspaper, about 30 sticks in a bundle, placed in a polyethylene bag and held under refrigeration at 34 degrees F. until ready to use. Often the budwood is selected from dormant stock in the nursery just prior to digging. The sticks are cut to a standard length, wrapped in damp newspaper, then placed in polyethylene bags and held in refrigerated storage between 30 and 32 degrees F. until the understock is ready to bud the following spring. This practice allows the commercial grower a longer period to bud his crop since the new growth in the field is seldom mature enough for budding purposes until late June.

Budding Process

The bud usually is inserted near the base of the seedling rootstock in the case of fruit trees, and near the base of the cutting, 1 to 3 inches from the ground, when budding roses. The steps in T-budding are described below:

1. Make a vertical cut through the bark of the understock about 1½ inches long (Figure 1a). At the top of this cut make a horizontal cut (Figure 1b), thus forming the T-cut. (In the Inverted T-bud the horizontal cut is made at the base of the vertical cut, Figure 4a.) Gently lift the bark from the wood by inserting the tip of the knife blade in the incision at the junction of the vertical and horizontal cuts. The bark should slip easily from the wood if budding is done when the understock is in an active stage of growth. The stock is now ready to receive the bud.

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2. The bud is removed from the scion stick on a shield-shaped patch of bark. Using a sharp knife, begin the cut about a half inch below the bud (Figure 2a). Cut into the wood slightly, then upward beneath the bud and out about a half inch above the bud. The bud is then removed with a shield-shaped sliver of bark and wood (Figure 2b).
3. Insert the base of the sliver into the top of the slightly opened T-shaped cut on the stock, gently pushing the shield downward beneath the bark of the T-cut (Figure 3a). Any portion of the shield sticking above the horizontal cut should be cut off with the knife so the under surface of the shield fits snugly against the wood of the stock (Figure 3c). The method of insertion is the chief difference in the several variations used in T-budding. When budding fruit trees, the leaf petiole is left intact on the budstick, providing a handle for inserting the shield-shaped piece of scion wood. In field budding roses, the budder moves down the row of rooted cuttings on his knees, bending over the plants as he works. As he removes the shield-shaped sliver containing the bud, he grasps the upper end of the shield between his thumb and the knife blade and inserts the lower end into the T-shaped cut on the understock. Another method used by some fruit tree budders is to make the horizontal cut on the stock at the lower end of the vertical cut. The bud shield is removed from the budstick by starting the cut about a half inch above the bud and exiting about a half inch below. The bottom of the shield is held against the knife blade by the thumb and inserted into the inverted T-shaped cut from the bottom, pushing upward until the bud is in position (Figures 4b and 4c).
4. Using a piece of ½-inch plastic plant tie or a rubber budding strip, wrap the bud firmly to hold it in place until the scion shield tissue is united with the tissue of the stock (Figures 3d and 4e). Rubber budding strips are probably the most widely used material for holding buds in place. They are made from a special formulation of rubber that will deteriorate within 4 to 6 weeks and drop off. This eliminates the necessity of cutting or removing the wrap by hand. Rubber strips are available in sizes from 3½ to 5 inches long and from 3/32 to 3/16 inch wide, depending upon the size of the understock being budded. When using either the rubber strip or the plastic tie, the wrap is started just below the bud, with the first wrap over the end, thereby holding it in place (Figure 3d). Continue the wrap up to the bud, then above the bud but not over it, until all the cut surface is covered. The free end of the strip is pulled under the last turn and pulled snugly, thus securing the wrap on the stock without a knot. Three to four wraps both above and below the bud are usually adequate.

   In the event of rapid growth of the understock immediately after budding, the binding strips may need to be cut to prevent girdling if the material doesn't deteriorate rapidly enough.

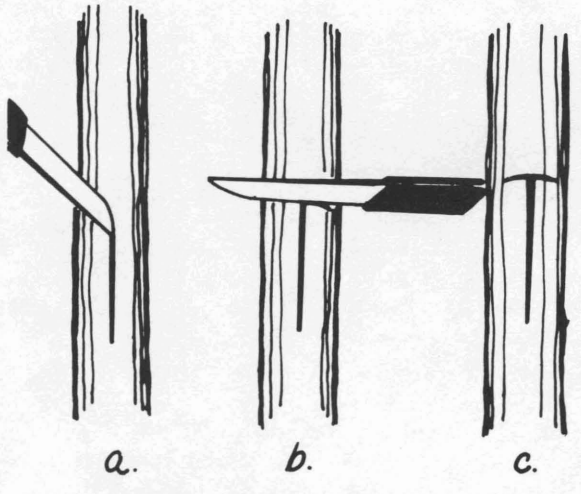

Fig. 1. Understock preparation.

a. A 1½-inch vertical cut is made through the bark of the stock plant.
b. A horizontal cut is made at the top of the vertical cut.
c. This is the completed T-shaped cut on the side of the stock plant.

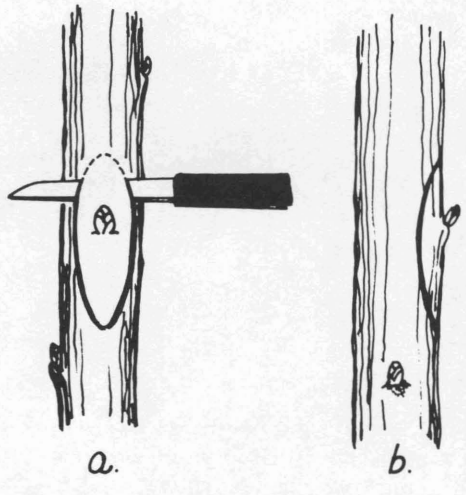

Fig. 2. Scion preparation.

a. Using a sharp knife, begin making the cut about a half inch below the bud, cutting into the wood and drawing the knife upward and then out so it comes through the bark about a half inch above the bud.
b. This side view shows how the knife has cut beneath the bud to remove it.

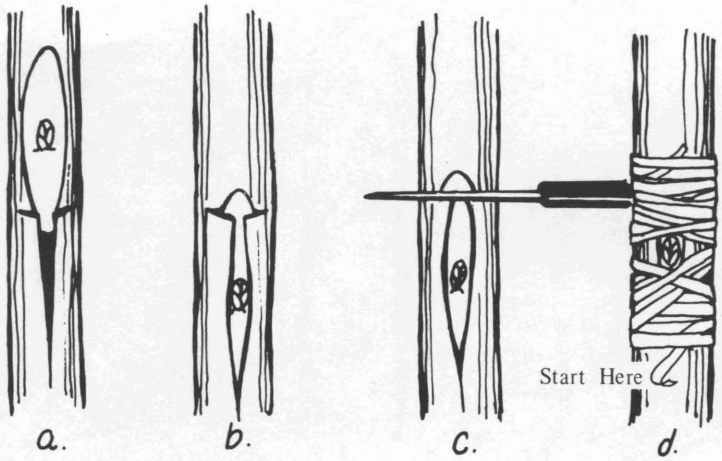

Fig. 3. Inserting the bud.

a. Insert lower edge of bud shield into the top of the slightly opened T-shaped cut on the stock.
b. Push the shield down into the opening so the bud is well below the horizontal cut.
c. If a portion of the bud shield protrudes above the horizontal cut, cut off the excess.
d. Using a strip of budding rubber or plastic plant tie, start at the bottom and wrap the stock so the lower end of the strip is held in place with the cross-over of the next round. About four or five wraps around the stock below the bud and the same number above will usually hold it securely and prevent desiccation. The upper end of the tie is inserted beneath the last round and pulled tightly to hold it in place.

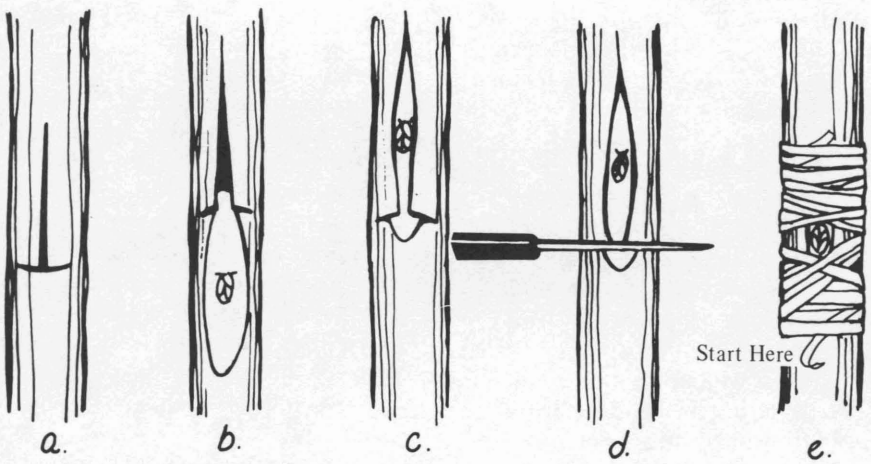

Fig. 4. Inverted T-Bud.

a. The incision is made with the horizontal cut at the base of the vertical cut.
b. The top edge of the shield-shaped bud is inserted at the base of the incision and pushed upward.
c. The bud shield is now in place.
d. Remove the excess portion of the shield so the lower edge fits tightly against the lower edge of the horizontal cut.
e. The bud is wrapped and tied in place.

Fig. 5. The top of the understock can be removed to force the bud to grow.

Care of Budded Plants

Usually the inserted bud will remain dormant until the following spring. Buds that force out in late summer may be injured by the winter cold.

In late winter or early spring, usually just before new growth begins, the top of the stock plant is removed just above the inserted bud (often referred to as bud union). With pome fruits (apple and pear) as well as roses the tops may be removed before growth begins. It is best to delay cutting back stone fruits until new growth actually begins, to prevent a high percent of loss.

When the inserted bud begins to grow after the top is removed, some pruning and topping may be necessary, especially on field grown roses, to allow a stronger union to develop. Otherwise strong winds may cause the new growth to blow off at the bud union.

Occasionally it is desirable to force out a newly budded species for testing, or perhaps the home gardener may not want to wait until the following spring to see the results of his handiwork. The bud can usually be forced into growth by a process called "crippling" the understock. The stock is partially cut and the top broken over just above the bud insertion (Figure 5). The cut is made on the side of the stock containing the bud, with the cambium or conducting tissues still intact on the opposite side. The top of the stock is bent over at the cut. This process forces the bud into growth, yet the crippled top still supplies carbohydrates to the root system until the new shoot matures. The crippled top is then removed and the resulting plant has the desired characteristics of the scion and the root system of the understock.

Novelty plants can be developed by the home gardener by inserting several different varieties of buds on the same stock, so that one plum tree will produce several varieties of plums or a rose bush several colors of flowers. To be successful, the scion and the understock must be very similar. The varieties within a species are usually compatible, and occasionally the species within a given genus are compatible. Seldom are plants of one genus compatible with plants of another genus.

When two or more varieties of plants are budded onto a single understock, the more vigorous variety will usually dominate the others unless a program of continual pruning and training is carried on to prevent this.

Any new growth arising below the bud union should always be removed at the point of origin. Such growth is usually referred to as sucker growth, and if allowed to remain may in time dominate the grafted scion, resulting in stunting or even loss of the desired variety.

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